AMENDMENTS TO THE DRAWINGS

Please substitute the attached Replacement Sheets 1 and 3 for sheets 1 and 3 of the drawings as originally filed.

REMARKS

Reconsideration and withdrawal of the rejections set forth in the Office Action dated November 24, 2008, is respectfully requested in view of this amendment. By this amendment, claims 1, 6, 11 and 16 have been amended. Claims 1-16 are pending in this application.

Claims 1, 6 and 11 have been amended to describe optical waveguide having a facet shape to be fitted with that of a reaction tube plate. Support is found in the Specification, *inter alia*, at Standard Paragraphs [0015] and [0070] - [0075] of Published Application US 2006/0145098. Claim 16 has been amended to depend from claim 11.

In addition, the Abstract has been submitted as a separate page and substitute drawing sheets 1 and 3 are submitted, referencing Figs. 2 and 5 as "prior art".

It is respectfully submitted that the above amendments introduce no new matter within the meaning of 35 U.S.C. §132.

In the outstanding Office Action, the Examiner objected to the Specification with respect to the Abstract, objected to the Drawings and objected to claim 16. Claims 1–16 are rejected under 35 U.S.C. §103(a) as being unpatentable over Applicants' Admitted Prior Art in view of U.S. Patent Application Publication No. 2003/0002038 to Mawatari (hereinafter *Mawatari*). These objections and rejections, as applied to the revised claims, are respectfully traversed in view of the above amendments.

Objection to the Specification

The Examiner objected to the Abstract as not commencing on a separate sheet. Accordingly the Abstract is resubmitted.

Replacement Drawings

The Examiner objected to Figs. 2 and 5 as not including a legend to indicate Prior Art. Accordingly substitute Sheets 1 and 3, containing Figs. 2 and 5, respectively, are submitted. The changes to these sheets consist of the addition of the legend "(Prior Art)" to Figs. 2 and 5.

Objection to the Claims

The Examiner objected to claim 16 as being a substantial duplicate of claim 10. Accordingly, claim 16 has been made dependent from claim 11.

Rejections Under 35 U.S.C. §103

The Examiner rejected claims 1-16 under 35 U.S.C. 103(a) over Applicants' Admitted Prior Art in view of *Mawatari*. The rejection, as applied to the amended claims, is respectfully traversed.

Response

This rejection is traversed as follows. To establish a *prima facie* case of obviousness, the Examiner must establish: (1) some suggestion or motivation to modify the references exists; (2) a reasonable expectation of success; and (3) the prior art references teach or suggest all of the claim limitations. *Amgen, Inc. v. Chugai Pharm. Co.*, 18 USPQ2d 1016, 1023 (Fed. Cir. 1991); *In re Fine,* 5 USPQ2d 1596, 1598 (Fed. Cir. 1988); *In re Wilson*, 165 USPQ 494, 496 (CCPA 1970).

A *prima facie* case of obviousness must also include a showing of the reasons why it would be obvious to modify the references to produce the present invention. *See Dystar Textilfarben GMBH v, C. H. Patrick*, 464 F.3d 1356 (Fed. Cir. 2006). The Examiner bears the initial burden to provide some convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings. *Id.* at 1366.

Applicants' claims describe:

> "... a thermoelectric element of supplying heat ... and a heat transmission block which transmit the heat to the reaction tubes ... a lamp which irradiates light with uniform intensity to sample contained in the reaction tube, and the optical waveguide which has a facet shape to be fitted with that of a reaction tube plate; and an optical system comprising receiving part for receiving fluorescence irradiated from the sample ... ." (Claim 1; claims 6 and 11 similar.)

The Examiner has deemed that Applicants' Admitted Prior Art discloses all the components of the independent claims 1, 6 and 11 except an optical waveguide, and the optical waveguide is disclosed in *Mawatari*.

Regarding the rejection, a real-time monitoring apparatus of the presently claimed subject matter as uses a light irradiation source comprising a lamp and an optical waveguide to irradiate uniform light into a sample within a reaction tube. The light in the light waveguide is propagated in a manner of total internal reflection, and the light beam at the end of the light waveguide becomes a uniform 2-dimensional light source. By using the uniform light beam, the reaction progress may be more easily measured over the whole range of the reaction tube (see [0051] of Applicants' disclosure). In addition, as shown in Fig. 3 of Applicants' disclosure, the light intensity at the edges of reaction tube plate has more than 85% of light intensity in the center of reaction tube plate by using the apparatus described by Applicants (see [0068]). This is a significant feature which is neither shown nor suggested by the cited references, in part because the light intensity at the edges of the plate is merely about 50-60% of that in the center absent Applicants' claimed features. (See [0061] of the Applicants' disclosure.)

Meanwhile, *Mawatari* relates to a photothermal spectroscopic analyzer having a separate excitation light source and probe light source (see Fig. 1 of *Mawatari*.) Although the expression "waveguide" is used in paragraph [0100] of *Mawatari*, the meaning of "waveguide" in *Mawatari* appears to be substantially different from that described and claimed by Applicants. More specifically, *Mawatari* discloses that a semiconductor laser, which can be used as a light source,

is classified as an index guided type or a gain guided type. If an index guided type or a gain guided type are to be used, the index guided type semiconductor laser is more desirable for excitation light because it has characteristics such as a single spectrum in comparison with a gain guided type, as well as small output variation and astigmatism of 10 μm or less. This is clearly set forth in Paragraph [0099] of *Mawatari*:

> [0099] In addition, generally, a semiconductor laser is classified into an index guided type or a gain guided type. An index guided type semiconductor laser has characteristics such as a single spectrum in comparison with a gain guided type, usually small output variation, and astigmatism of 10 μm or less. In application to a thermal lens spectrometry, since the above-described three characteristics influence an S/N ratio (Signal-to-Noise ratio) of a thermal lens signal, it is desirable to use an index guided type.

It is further pointed out that *Mawatari* teaches that, as for a "waveguide type", the index guided type semiconductor laser is also more desirable for a probe light such as in the case of the excitation light (see [0100] of *Mawatari*.) It is noted that the expression "waveguide type" has been disclosed only in this sentence throughout the specification of *Mawatari*, and the characteristics or properties of the waveguide are not disclosed at all. Therefore, the only reasonable interpretation of *Mawatari's* use of "waveguide type" is as described in Paragraph [0099] as set forth above.

Moreover, Applicants' claimed apparatus is able to monitor biochemical reaction by analyzing the receiving fluorescence reflected from the sample (see [0051] and [0052] of the present specification). This is achieved by the use of thermal lens spectrometry which measures heat emitted by the measuring object upon light irradiation. This is a substantially different monitoring technique than that described by *Mawatari*. Applicants refer to *Mawatari* at [0012] and [0013] in this regard:

> [0012] In addition, since the sensitivity of absorption photometry is low in comparison with the photoinduced fluorescence method or chemiluminescence method, the concentration sensitivity of the absorption photometry has been increased by providing dozens mL of measuring object, which is sufficient

quantity, and making optical path length be 1 cm which is long. However, in .mu.-TAS, since the optical path length becomes 1/10 to 1/100 as described above, the absorption photometry has a problem that sensitivity is low when it is applied to .mu.-TAS although it is a common and highly versatile detection method.

[0013] As detection methods which solve the above-described problems simultaneously, photothermal spectroscopy methods are mentioned. These detection methods are methods of utilizing a phenomenon of a measuring object absorbing light that is usually a laser beam with the same wavelength as the absorption wavelength of the measuring object (hereafter, this light will be described as excitation light), and emitting heat (photothermal effect) to a surrounding solvent following relaxation process, and analyzing the concentration and the like of the measuring object by measuring the heat. The photothermal spectroscopy methods have a characteristic that the amount of absorption of light, i.e., the heat can be directly measured against the absorption photometry indirectly measuring the amount of absorption of light as the amount of decrease of transmitted light.

Therefore, the presently claimed subject matter and *Mawatari* use *different* measuring mechanisms to measure *differently* and therefore achieve their results in a *different* manner.

Accordingly, *Mawatari* merely discloses the expression "waveguide type", of which the construction, reaction mechanism and the functional effect of the waveguide are completely different from that of Applicants' claimed subject matter. Therefore, it is respectfully submitted that Applicants' subject matter cannot be obtained from the cited combination.

Applicants further point out that the properties of the optical waveguide added to independent claims 1, 6 and 11 further distinguish the claimed subject matter from the cited art. In particular, there is no suggestion in either Applicants' Admitted Prior Art or *Mawatari* that an optical waveguide has a facet shape to be fitted with that of a reaction tube plate in which a light source irradiates light with uniform intensity to sample contained in the reaction tube.

Applicants therefore respectfully submit that Applicants' Admitted Prior Art and *Mawatari* do not teach or suggest all the features as recited in claims 1, 6 and 11. It is therefore respectively submitted that the rejection under 35 U.S.C. 103(a) should be withdrawn.

CONCLUSION

In light of the foregoing, Applicants submit that the application is in condition for allowance. If the Examiner believes the application is not in condition for allowance, Applicants respectfully request that the Examiner call the undersigned.

Respectfully submitted,
THE NATH LAW GROUP

February 24, 2009

THE NATH LAW GROUP
112 South West Street
Alexandria, VA 22314-2891
Tel: 703-548-6284
Fax: 703-683-8396

Jerald L. Meyer
Registration No. 41,194
Derek Richmond
Registration No. 45,771
Stanley N. Protigal
Registration No. 28,657
Customer No. 20529